

# **EVOLUTION**

## **I. EVOLUTION** – change in a species over time

## **II. EVIDENCE OF EVOLUTION**

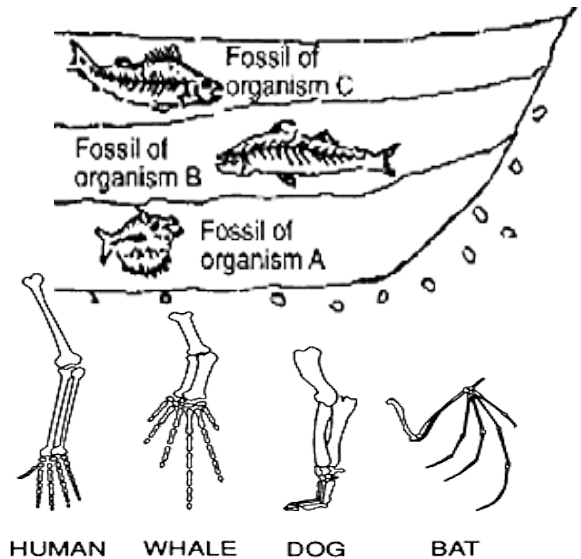
### **FOSSILS** – remains of living things

- a. Law of Superposition – younger layers of sedimentary rock lay on top of older ones
- b. **In the diagram below, which fossil is:**

OLDEST = A      MOST COMPLEX = C  
 YOUNGEST = C      MOST SIMPLE = A

### **ANATOMICAL EVIDENCE**

- a. Homologous structures – structures that evolved from similar body parts (similar structure BUT different function)
- b. Examples: human arm, whale flipper, dog leg, bat wing



## **III. CHARLES DARWIN**

**NATURAL SELECTION** – those organisms best adapted to their environment will survive & reproduce

**ADAPTATION** – a change that helps an organism better adapt to an environment → survive

### **BASED ON 5 MAIN POINTS**

- a. OVERPRODUCTION – organisms produce too many offspring → competition → natural selection
- b. COMPETITION – limited resources → organisms compete → natural selection
- c. VARIATION – differences between organisms → best adapted will survive & reproduce  
 Example: Polar bears with thicker fur will survive & reproduce
- d. SURVIVAL OF THE FITTEST – those best adapted will survive & reproduce
- e. SPECIATION – over time favorable adaptations survive & unfavorable disappear → new species

### **REVIEW**

1. In which organisms could evolution occur most rapidly?  
 (1) humans    (2) fish    (3) birds    (4) bacteria
2. The effects of natural selection are generally seen most quickly in which organisms?  
 (1) bacteria    (2) humans    (3) corn plants    (4) cats
3. Which event is the best example of competition between species in a pond environment?  
 (1) dragonflies landing on lily pads  
 (2) frogs and toads eating flies  
 (3) lizards and snakes lying in the sun  
 (4) hawks eating mice
4. Which group of organisms can show significant trait changes in the shortest period of time?  
 (1) bacteria    (2) fish    (3) birds    (4) reptiles
5. Feathers, wings, and the hollow bones of birds are examples of  
 (1) adaptations for flight    (3) unnecessary body parts  
 (2) responses to stimuli    (4) reproductive structures
6. Competition is most likely to occur between which two organisms?  
 (1) deer and butterflies    (3) goldfish and rabbits  
 (2) owls and bacteria    (4) grass and strawberry plants
7. Although change in multicellular species usually takes thousands of years, some species of bacteria undergo major changes in just a few years. One reason for this difference is that these bacteria  
 (1) are microscopic    (3) reproduce very quickly  
 (2) do not contain DNA    (4) cause infectious diseases

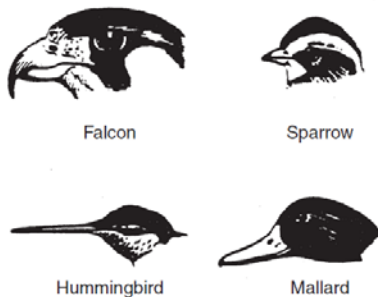
8. Evidence that living things have evolved over hundreds of millions of years can be found in
- (1) particles in the air
  - (2) rocks containing fossils
  - (3) tree rings from recently logged trees
  - (4) chemicals in human hair

9. Extinction of a species is most likely to occur as a result of
- (1) evolution      (3) selective breeding
  - (2) migration    (4) environmental changes

10. Some kinds of fish live most of their lives in salt water but lay their eggs in freshwater. Their ability to survive in different environments is an example of
- (1) adaptation                      (3) a habit
  - (2) developmental stages      (4) selective breeding

11. The fur of a snowshoe rabbit changes to white during the winter. This change is an example of
- (1) adaptation      (3) metamorphosis
  - (2) competition    (4) metabolism

12. The diagram below shows the head structure of four different birds.



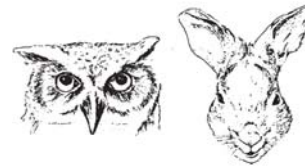
- The birds' beaks show how the birds
- (1) compete for the same food in their community
  - (2) require different amounts of food for survival
  - (3) store food for the winter months
  - (4) are adapted to get food from different sources

13. The drawing below shows a woodpecker using its long, sharp beak to obtain insects.



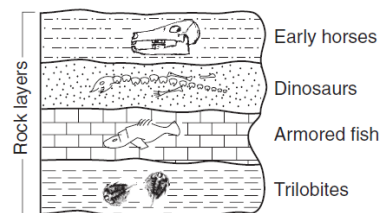
- What factor might contribute to the extinction of this species of woodpecker?
- (1) a new source of food
  - (2) an overabundance of trees
  - (3) the use of pesticides in the forest
  - (4) an increase in the population of insects

14. The eyes of the owl and the rabbit shown in the diagram below give each animal a different advantage. The front-facing owl eyes allow the bird to accurately judge distance when swooping in on prey. The side-facing rabbit eyes allow the animal to detect the motion of possible predators.



- The specialized eye types of these animals are examples of
- (1) disruptions of the natural balance
  - (2) the interdependence of living things
  - (3) adaptations for survival under certain conditions
  - (4) involuntary responses to stimuli

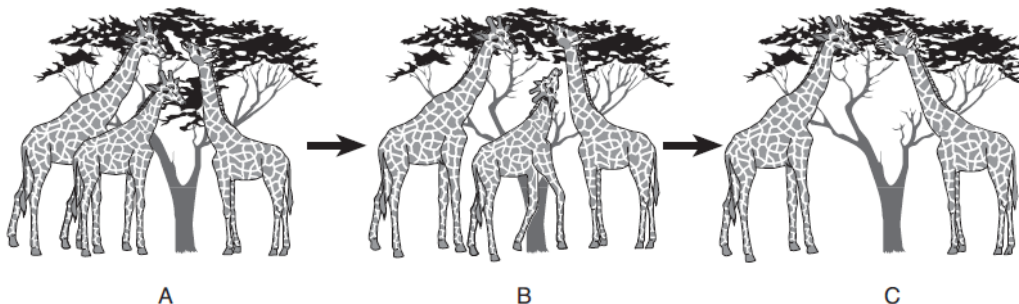
15. The cross section below shows fossils and the rock layers in which they are found. Crustal movement has *not* displaced the rock layers.



- Which fossil is considered the oldest in the cross section shown?

- (1) armored fish    (2) early horses    (3) dinosaurs    (4) trilobites

16. The diagram below shows a population of adult giraffes over time. Letters A, B, and C represent three time periods.



Bernstein et al (1998), Concepts and Challenges in Life Science Teachers Edition (3rd), Globe Fearon, Inc., p. 389 (adapted)

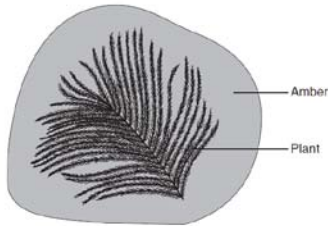
Which process does this diagram best represent?

- (1) ecological succession    (2) natural selection    (3) genetic engineering    (4) asexual reproduction

17. Base your answers to the following question on the reading passage and diagram below and on your knowledge of science.

**Preserved in Amber**

Sap is a substance secreted by some trees. Many years ago, plants and small animals were caught in the sap on the trees. Sap hardens and turns into a clear substance called amber. The plants or animals are preserved as fossils in the amber. Part of a plant preserved in amber is shown below.



Explain why fossils are important to scientists.

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18. The diagram below shows two different-colored moths resting on a tree trunk.



How does this difference in pattern and color affect the moths' ability to survive in the environment?

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19. Base your answers to the questions below on the information below and on your knowledge of science.

**Maintaining a constant body temperature, no matter what the temperature of its surroundings, is a condition that needs to be balanced in many organisms. This ability is important to the organism's survival. These organisms have many different body structures and behaviors that help maintain a constant body temperature.**

a. Whales have a thick layer of blubber (fat) under their skin. How does this blubber help the whales to maintain a constant body temperature?

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b. Humans sweat when they are in the hot sun. How does sweating help humans to maintain a constant body temperature?

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c. Foxes living in different parts of the world have different-sized ears. The arctic fox, which lives in cold climates, has small ears. The desert fox, which lives in hot climates, has large ears. How does ear size help each of these foxes to maintain a constant body temperature?

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